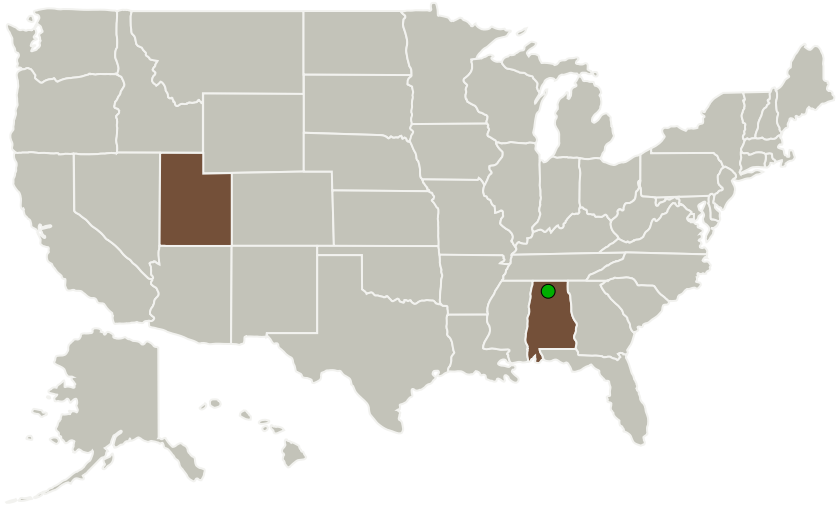
Extremely High Suction Performance Inducers for Space Propulsion, Phase I

Completed Technology Project (2010 - 2011)

Project Introduction

Advanced pump inducer design technology that uses high inlet diffusion blades, operates at a very low flow coefficient, and employs a cavitation control and stability device. A preliminary scoping inducer test with this technology indicated a doubling of the suction specific speed capability over current inducers. A three to four fold increase over current technology is the goal of this research effort. This increase would significantly enhance the capability of rocket engine systems through increased thrust-to-weight, specific impulse, simplicity, operational safety, and turbopump life. It would also reduce turbopump and propellant tank weight and system costs by eliminating boost pump systems and allowing for thinner lower pressure tank walls. Ultimately, the technology opens up the rocket engine/vehicle design space and allows for a large increase in vehicle performance by significantly moving the pump suction performance constraint from its current position.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Concepts ETI, Inc.	Lead Organization	Industry	White River Junction, Vermont
Brigham Young University-Provo	Supporting Organization	Academia	Provo, Utah
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Utah

Project Transitions

January 2010: Project Start

January 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140153)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Concepts ETI, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Kerry N Oliphant

Co-Investigator:

Kerry Oliphant

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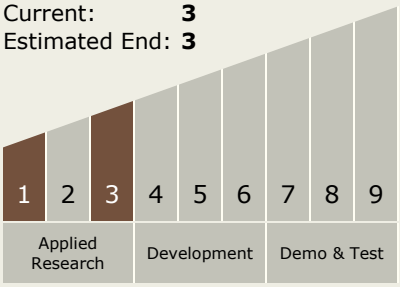
Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System